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Nannotheres moorei, a new genus and species of minute pinnotherid crab from Belize, Caribbean Sea (Crustacea: Decapoda: Pinnotheridae)

Raymond B. Manning and Darryl L. Felder

(RBM) Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.;
(DLF) Department of Biology, University of Southwestern Louisiana, Lafayette, Louisiana 70504, U.S.A.

Abstract.—*Nannotheres moorei* is described from a small pteriid bivalve mollusk taken in the Caribbean Sea off Belize. This minute, ovigerous pinnotherid crab can be distinguished by its size and the 2-segmented palp on its third maxilliped. With a carapace width of about 1.5 mm in a sexually mature female, it may be the smallest known species of crab.

The minute crab described below was found on the edge of the shell of its host by Donald R. Moore, University of Miami, who gave it to us for study. The unique holotype is in the collections of the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (USNM).

Abbreviations used below include: cb, carapace breadth; m, meters; mm, millimeters; Mxp3, third maxilliped; P1–P5, pereopods (P1 is the cheliped, P2–P5 the walking legs); Plp, pleopod.

Nannotheres, new genus

Diagnosis.—Adult female: size very small, carapace length less than 2 mm. Carapace soft, subcircular, lacking both sharp anterolateral border and longitudinal sulci anteriorly on dorsal surface. Front projecting only slightly, deflected. Mxp3 with ischium and merus indistinguishably fused; exopod present; palp 2-segmented, proximal longer than distal, segments articulated end-to-end; distal segment very short, rounded distally. Walking legs similar, dactyli simple, subequal. Abdomen of 7 somites, in ovigerous female expanded well beyond bases of walking legs and mouthparts.

Male: Unknown.

Type species.—*Nannotheres moorei,* new species, by present designation and monotypy.

Etymology.—From the Greek, *nannos,* small, and *tereo,* to guard, as used in the name *Pinnotheres.* The gender is masculine.

Host.—A bivalve mollusc of the family Pteriidae, *Malleus candeanus* (d'Orbigny). Waller & Macintyre (1982:490) reported that "In the vicinity of Carrie Bow Cay, Belize, specimens of *Malleus candeanus* are common from a depth of 5 m in the high-relief spur and groove zone seaward to the deepest area explored by SCUBA diving, 46 m on the steeply inclined fore-reef slope."

Remarks.—Manning (1993b:128) listed four genera of pinnotherid crabs that were characterized by the presence of (1) simple dactyli on the walking legs and (2) a Mxp3 palp composed of only two segments: the American genera *Calyptraeotheres* Campos, 1990 and *Epulotheres* Manning, 1993(a) and the Indo-west Pacific genera *Ostracotheres* Milne Edwards, 1853 and *Xanthasia* White, 1846. In addition to being much smaller than species of any of these genera, *Nannotheres* differs from them as follows: (1) it lacks the sharp anterolateral

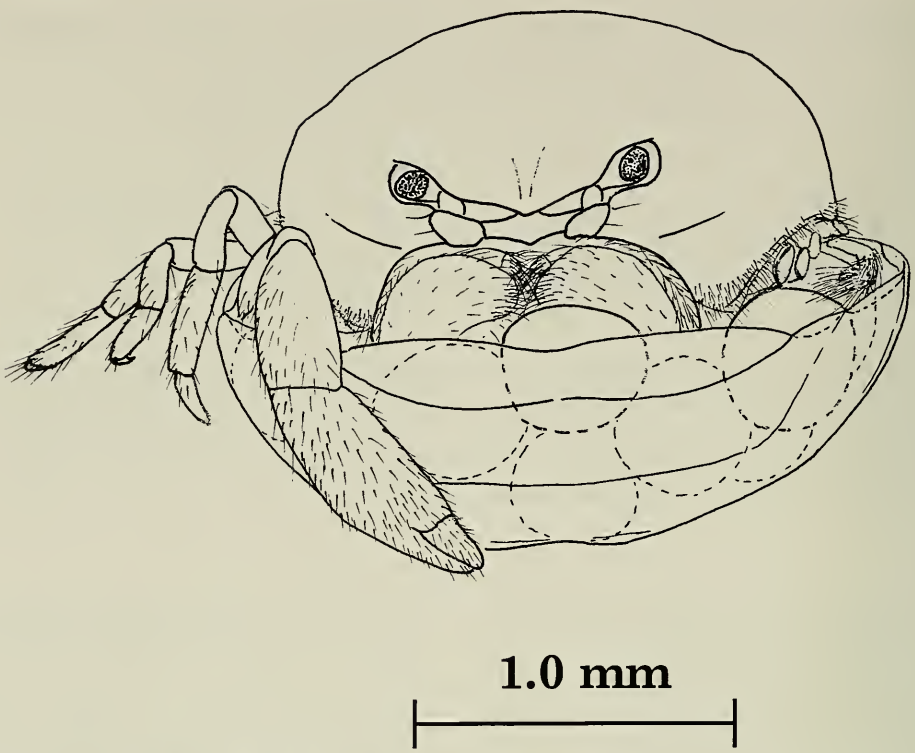

Fig. 1. *Nannotheres moorei,* new genus, new species. Ovigerous female holotype, USNM 277631, frontal view.

border and anterior longitudinal sulci of the dorsal surface of the carapace that are found in *Calyptraeotheres*; (2) it lacks the upturned lateral margins and prominent, median, mushroom-shaped tubercle found on the carapace of *Xanthasia*; (3) the Mxp3 is very different from that of *Ostracotheres,* in which the broad, spatulate propodus is much larger than the carpus; and (4) it has a 2-segmented palp on the Mxp3 in contrast to the 3-segmented palp of *Epulotheres,* which, as we will show below, was misinterpreted by Manning (1993a) in his original account of the genus.

Nannotheres moorei, new species
Figs. 1, 2, 3a

Material.—Belize, Lighthouse Reef [17°20′N, 87°32′W], The Blue Hole, depth 43 m, on a dead pteriid bivalve, *Malleus candeanus* (d'Orbigny), leg. Eberhard Gishler: 1 ovigerous ♀, cb about 1.5 mm (holotype, USNM 277631).

Description.—Adult female: size small, carapace width of ovigerous female about 1.5 mm. Carapace thin, membranous, apparently subcircular, regions indistinct; lateral surfaces almost vertical, lower extreme setose. Front depressed. Eyes very small, visible in dorsal view.

Mxp3 with ischium and merus indistinguishably fused, broadly ovate distally, mesial margin concave proximally, strongly convex and weakly tuberculate distally; palp articulated at about midlength of inner distal face of ischium-merus, 2-segmented, proximal longer, distalmost segment short, rounded, terminally setose. Exopod 2-segmented.

Chela (P1) with movable finger about as long as palm (measured dorsally), cutting edges lacking distinct teeth, cutting edge of

fixed finger with low, long, convex, sharp superior flange. Palm height more than half dorsal length. Surfaces of palm overall sparsely setose, inner face with strong setae in lower half.

Walking legs (P2–P5) equal right and left, sparsely setose, P3 and P4 lacking swimming setae; relative lengths, P5 < P4 < P2 < P3; dactyli of walking legs subequal, simple, and similar; propodus of P5 shortest of all propodi. P2 with dactylus 0.7 times as long as propodus, latter 3.7 times longer than high, 1.2 times as long as carpus; merus 1.7 times as long as carpus. P3 with dactylus (missing from right P3 in Fig. 2*d*) 0.7 times as long as propodus, latter 3.6 times longer than high, 1.2 times as long as carpus; merus 1.7 times as long as carpus. P4 with dactylus 0.7 times as long as propodus, latter 2.8 times longer than high, 1.3 times as long as carpus; merus 1.8 times as long as carpus. P5 with dactylus 0.9 times as long as propodus, latter 2.6 times longer than high, 1.1 times as long as carpus; merus 1.3 times as long as carpus.

Abdomen extending well beyond bases of walking legs and buccal mass, lateral edge of abdomen folded inward.

Plp1 biramous, both branches 2-segmented; Plp2 biramous, exopod 2-segmented, extending around outside of egg mass; Plp3–4 uniramous, 2-segmented. Ova large, 17 in number, 0.35–0.5 mm in diameter.

Size.—Unique holotype, ovigerous female, carapace width about 1.5 mm.

Etymology.—Named for Donald R. Moore, Rosenstiel School of Marine and Atmospheric Sciences, University of Miami, Florida, whose keen eye spotted this minute crab on the edge of its host's shell after it had been brought on deck.

Remarks.—Schmitt et al. (1973:9) listed four nominal species of *Pinnotheres* that were associated with bivalve molluscs of the genus *Pinctada* Bolten, *P. margarita* Smith, 1869, from the eastern Pacific; *P. margaritiferae* Laurie, 1906, from Ceylon; *P. villosulus* Guérin-Méneville, 1831, from Indonesia; and *P. trichopus* Tesch, 1918, from Indonesia. In addition to being larger, all of these species have three-segmented palps on Mxp3, so they can be separated at once from *Nannotheres* on the structure of the Mxp3 alone. Campos (1989) transferred the American *P. margarita* Smith to his new genus *Tumidotheres.*

Pesta (1911) reported *Pinnotheres* sp. from a *Pinctada* taken in the Molucca Islands and remarked that the host had a nodular growth inside the shell that housed the crab. We could see no such feature in the host of our specimen from Belize. Barnard (1950) also recorded a *Pinnotheres* sp. from a *Pinctada.*

Examination of the specimens of *Malleus candeanus* from Belize studied by Waller & Macintyre (1982) yielded no other specimens.

Although a note accompanying the specimen suggested that it was found, dead, on the edge of the shell of its host, examination of the dried host revealed that the left chela of the crab remained attached to the mantle of the host. The crab seemed to have little internal tissue; the only visible muscles were associated with the egg-bearing pleopods.

Our first comparison of this little crab was with the type species of *Epulotheres* Manning, 1993(a), *E. angelae,* from the Caribbean Sea, as it, too, is small and was reported to have a two-segmented palp on Mxp3. Reexamination of the Mxp3 revealed that the original account was in error, as it has a three-segmented palp (Fig. 3*b*). It can be separated from *Nannotheres* on that feature alone. *Epulotheres* remains a valid genus, distinct from *Pinnotheres* s.s., for its Mxp3 has a very different shape from that of *Pinnotheres pisum* (Linnaeus, 1767), the type species of *Pinnotheres* Bosc, 1802. In *Nannotheres* the fused ischium-merus is much more oval, the inner margin lacking the angled projection found in the Mxp3 of *Pinnotheres*; the carpus and propodus of the Mxp3 are subequal in length and shaped very differently from those of *P. pisum*; and the palp is very short

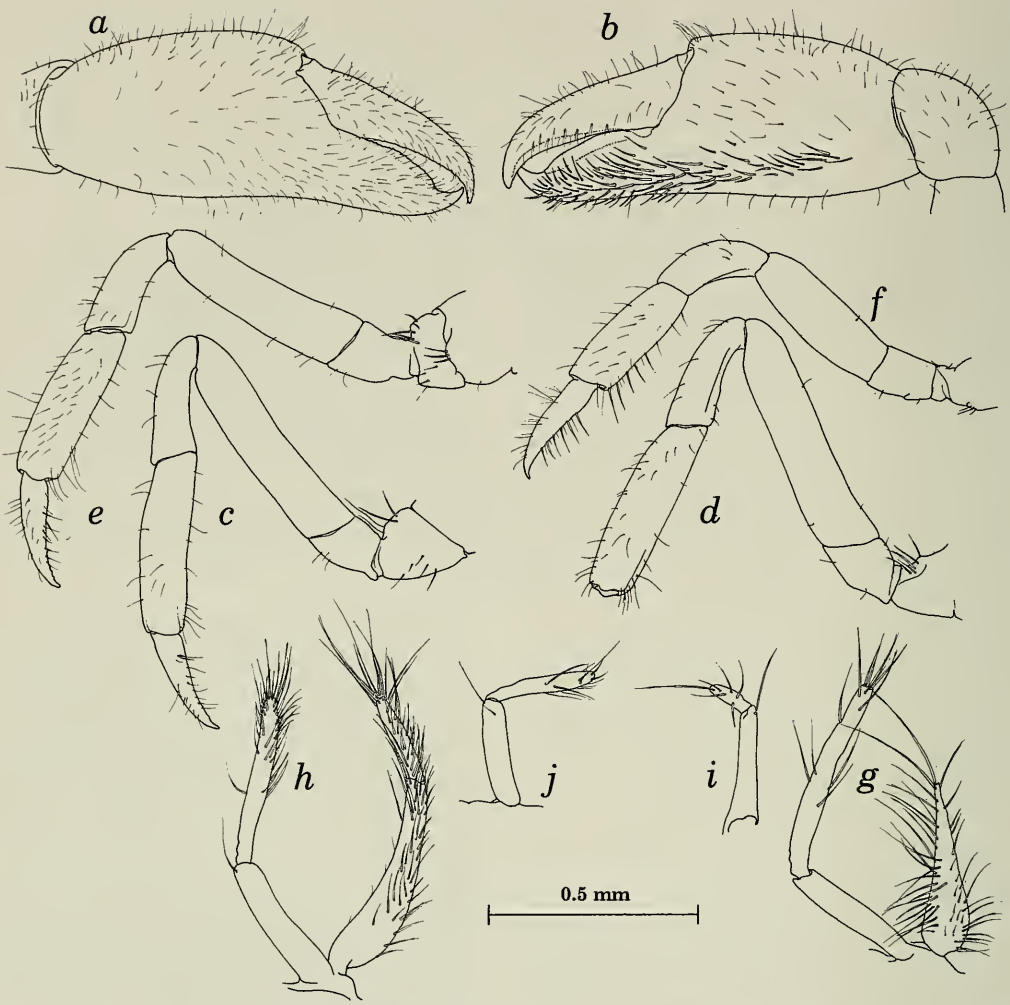

Fig. 2. *Nannotheres moorei,* new genus, new species. Ovigerous female holotype, USNM 277631. *a,* Right chela, outer face; *b,* Right chela, inner face; *c,* Right P2, anterior face; *d,* Right P3, anterior face (dactylus missing); *e,* Right P4, anterior face; *f,* Right P5, anterior face; *g,* Right Plp1, anterior face; *h,* Right Plp2, anterior face; *i,* Right Plp3, anterior face; *j,* Right Plp4, anterior face.

and inserted almost at the mid-point of the distal margin of the propodus in *N. moorei,* rather than being long and slender and inserted basally as in *P. pisum.*

We believe that this species may be the smallest known brachyuran crab. It is smaller than members of the pygmy pirimelid crab *Sirpus* Gordon, 1953(a), in which ovigerous females are as large as 4.5 to 7.0 mm long in *S. monodi* Gordon, 1953(b). Adults of S. *gordonae* Manning & Holthuis, 1981, are 2.5 to 3.1 mm long, and adults of the type species of *Sirpus, S. zariquieyi* Gordon, 1953(a), are 3.4 to 5.1 mm long (Manning & Holthuis 1981:71); ovigerous females are not known in these latter taxa. *Nannotheres moorei* also is smaller than all of the cryptochirid crabs mentioned by Kropp & Manning (1987) and Kropp (1989, 1990), which may be narrower but always are longer. Ovigerous females of the diminutive *Epulotheres angelae* Manning, 1993 are twice as wide, with carapace widths of 3.0 and 3.1 mm.

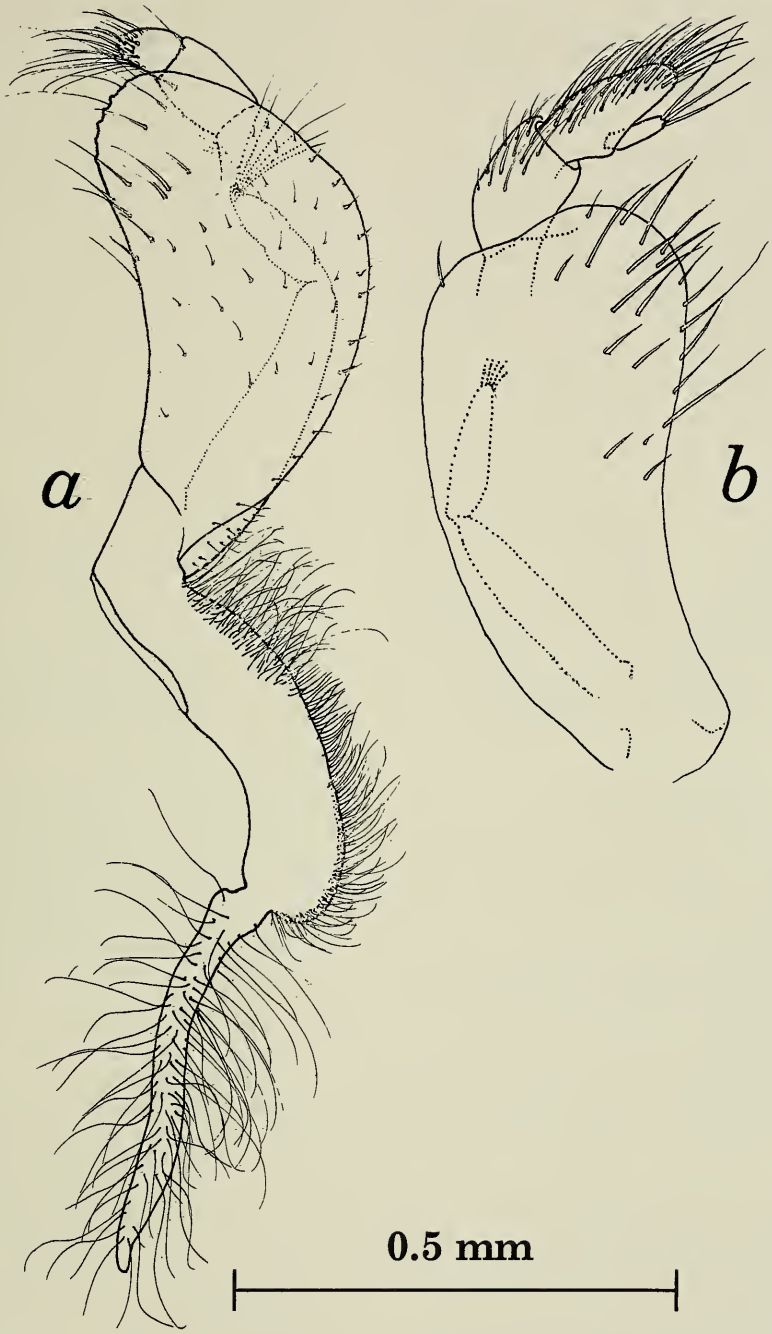

Fig. 3. Outer face of MXP3. *a, Nannotheres moorei,* new genus, new species, ovigerous female holotype, USNM 277631; b, *Epulotheres angelae* Manning, spent female holotype, USNM 256975.

Distribution.—Known only from the type locality, The Blue Hole, Lighthouse Reef, Belize, Caribbean Sea.

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